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from M M Johnson

Military Handbook

of the

JOHNSON

SEMI-AUTOMATIC RIFLE

MILITARY HANDBOOK OF
THE JOHNSON SEMI-AUTOMATIC RIFLE

INDEX

JOHNSON AUTOMATICS TRUST

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FOREWORD

No army in the world is actually equipped with semi-automatic rifles. Yet there can hardly be a general staff which is not acutely aware that the advent of the semi-automatic rifle is inevitable in the development of firearms. The single-shot breech loader rendered the muzzle loader immediately obsolete. The magazine rifle displaced the single-shot breech loader. The self-loading semi-automatic is now about to dislodge the magazine rifle, which, as a bolt action type, has been the standard military arm for fifty years.

The armies of the world have not accepted these developments from choice but from necessity. Technical and tactical superiority go hand in hand. The issue of modernity is too important to be disregarded.

No technical development, however, has displaced the infantryman and his rifle as the basis of all battle action. Their success depends on **mobility** and **fire power.** The former has been aided by mechanization. The latter is precisely where it was in 1914.

Presumably it can be accepted that until some radical substitute for the conventional rifle cartridge is evolved, the semi-automatic rifle is the most deadly, most efficient, and most mobile single weapon capable of being carried and operated by the individual soldier. Firing between thirty and forty aimed shots a minute, its effective rate of fire is from two to three times that of the magazine rifle.

Little imagination is required to visualize the opportunities offered by such an increase in potential fire power. The small, compact corporal's command assumes the present importance of the platoon. The low flying aeroplane, the tank, the armoured car, become menaced by infantry, who virtually helpless today, tomorrow may be capable of delivering bursts of ultra high velocity armour-piercing ammunition at the rate of a round a second per rifle.

With no necessity for bolt manipulation, the plane can be led as one would a flying bird with a shotgun. So intense a concentration by a number of rifles would render the tracks of vehicles and all but the heavier types of armour vulnerable.

For short bursts, the semi-automatic rifle will accomplish some of the missions of the light machine gun, with economy in life and energy, while still retaining its main characteristic as the mobile individual weapon for assault or defense.

The military semi-automatic requires little more for its development than an action capable of economical and rapid manufacture which will function reliably in spite of the maltreatment and harsh conditions inevitable in active service. Needless to say, it must be light enough to fulfill its function as the individual soldier's weapon.

Both energy and ingenuity have been bestowed on this problem which at first sight might appear simple enough. Many solutions have been offered. A fraction of them, like the gas-operated Mondragon which was given a trial by the German Army in 1914, have been carried beyond the tool room to the field test stage, only to be discarded in the end as impracticable. Today another gas operated weapon is probably the only military semi-automatic which has achieved the stage of actual manufacture in quantity.

There are two expedients, generally speaking, by which a rifle may be made self-loading, — by harnessing the energy of recoil, or by utilizing the gases generated in the explosion of the cartridge. The necessity for highly critical tolerances combined with essential lightness in weight have served to defeat the latter. For the moment, at least, gas operated rifles, constitutionally delicate and intricate to manufacture, may be regarded as interesting experiments but impracticable for military use.

Recoil is the simplest and most fundamental force available in a rifle for performance of the cyclic functions of ejecting the fired round, recocking and reloading. It has been used in the past in belt fed machine guns and in automatic pistols. The former are necessarily intricate mechanisms, heavy and cumbersome. The latter are suited only to ammunition developing low pressures.

Military requirements and the modern high-powered cartridge, developing pressures from fifteen to forty tons per square inch present peculiar problems. The Johnson Semi-Automatic Rifle, a newcomer in the field, has solved these problems.

The Johnson Semi-Automatic Rifle is a recoil operated weapon. Weighing approximately nine and a half pounds*, it is within the weight limit for a military weapon. It is sufficiently simple that there is no part of it which could not,—indeed which has not, been manufactured in a normally equipped machine shop. In functioning it is at least as reliable as the modern manually operated bolt action rifle.

No special lubrication is required. It is accurate. It may be stripped to the last part in a matter of seconds. It may be stripped, moreover, by unskilled hands.

The Johnson Semi-Automatic Rifle fulfills all military requirements. It is the individual soldier's weapon, the military semi-automatic par excellence.

* Eight and three-quarters pounds for the vertical feed type.

OBJECTIVES AND POLICIES

The Johnson Automatics Trust takes pleasure in announcing the Johnson Semi-Automatic Military Rifle, cal. .30 M1 and other military calibers. The Johnson Semi-Automatic Rifle (as well as the Johnson Light Machine Gun, described separately) was invented by Captain Melvin Maynard Johnson, Jr., U. S. Marine Corps Reserve, of Boston, Mass., in 1936. The inventor is the president of Johnson Automatics Trust.

A semi-finished pilot model of the rifle was completed in 1936, and the manufacture of several test models was begun. During 1938 four additional models of the rifle were completed and given unusually severe firing tests.

In the same year complete production drawings were prepared. Proof models made from these drawings were built for the purpose of establishing the reliability of the measurements on the drawings.

The Johnson Automatics Trust is now prepared to furnish these rifles upon order in any desired quantities. Qualified manufacturing organizations indicate that delivery of initial lots can be made within 8 to 10 months of receipt of orders, subject to the quantity required.

The Johnson Automatics Trust is organized for the purpose of procuring the manufacture of Johnson rifles. Thus, it is possible for the Trust to contract with one or more manufacturing organizations for the filling of orders. The Trust is, therefore, in a position to fill orders promptly and efficiently.

The Johnson Automatics Trust lays primary emphasis upon manufacturability, and, more especially, upon interchangeability of component parts. Johnson rifles are made from thoroughly proven production drawings. The tolerances established on these drawings have been proved in by the construction of firing models made to the maximum, minimum, and median limits established on the drawings. There are no hand fitting operations (gunsmithing) required or allowed in the making of Johnson semi-automatic rifles. All parts are expected to fit as they come from the machines. The accomplishment of this objective is believed to be unique in the field of military firearms.

In the event a buyer of military rifles prefers to arrange for the manufacture of the rifles in the buyer's own factories or arsenals, the Johnson Automatics Trust has prepared complete manufacturing data. It is in a position to furnish all the necessary specifications of production equipment, together with the necessary production equipment if it is desired that the Trust shall furnish this.

Attention is called to the fact, however, that the Johnson Automatics Trust can give more rapid deliveries of completed rifles when orders for the manufacture of rifles are placed with the Trust. Inasmuch as the Johnson Automatics Trust is also engaged in the manufacture of semi-automatic sporting rifles, it will be possible for the Trust to give extremely rapid delivery where the buyer's specifications do not deviate materially from the specifications of the standard Johnson semi-automatic sporting rifle.

The Johnson Automatics Trust is, of course, fully protected by domestic and foreign patents. In order to avoid misunderstanding, attention is drawn to the fact that the Johnson Semi-Automatic Rifle is a very recent development. It has never been rejected by any government or other buyer.

GENERAL DESCRIPTION

a. The Johnson Semi-Automatic Military Rifle is a self-loading shoulder weapon of the short recoil type adaptable to any high-powered cartridge. It is equipped with a rotary feed magazine with a capacity of ten rounds loaded from any standard clip*, or with a vertical feed box magazine of optional capacity.

The rifle fires semi-automatically only, as slowly or as fast as may be required, by a separate pressure of the trigger for each shot. The rifle will only fire if the breech is closed and locked. The force of recoil is utilized to operate the mechanism of the rifle.

Upon the cartridge being fired, the barrel recoils approximately $\frac{3}{8}$ths of an inch During the rearward passage of the barrel the rotary bolt is turned through 20° by the action of the camming arm on the bolt against the camming face in the receiver. The bolt does not begin to unlock until the bullet is approximately two feet from the muzzle. The bullet is between four and five feet from the muzzle when the bolt is fully unlocked. The unlocking of the bolt lugs precedes primary extraction. When the bolt is fully unlocked the barrel is arrested in its movement. The bolt, impelled by its momentum and by residual pressure, then travels to the rear, extracting and ejecting the empty case.

This movement compresses the recoil spring in the butt stock and cocks the hammer.

The force of the main spring returns the bolt. In its forward movement, the bolt picks up the top cartridge from the magazine and chambers it. In loading, the cartridge is not required to enter the chamber from the side or at an abrupt angle, so that the bolt has full control of the head of the cartridge at all times, and the possibility of jams is eliminated.

The locking cam rotates the bolt to the locked position, engaging the locking lugs with the locking abutments.

The rifle is then ready to fire. When the last round has been fired the bolt remains open on rotary magazine models.

b. The theoretical cyclic rate of fire of the Johnson Semi-Automatic Rifle is 600 rounds per minute. The deliverable rate of fire is limited only by the dexterity of the operator. Starting with a fully loaded magazine, ten aimed rounds can be fired in ten seconds. The approximate maximum rate of aimed fire is forty rounds a minute.

The barrel is exposed to the air for its entire length, allowing the most efficient air cooling by the natural radiation of barrel heat. In practice it is impossible to overheat the barrel.

c. The accuracy of aim is not impaired by the automatic action. Under conditions of deliberate fire it is fully as accurate as any standard bolt action military rifle.

Under conditions of sustained rapid fire it is far more accurate by comparison. Sights can be held on the target and the recoil on the shooter's shoulder is rendered negligible, as recoil is partially absorbed in actuating the mechanism.

d. There being no critical tolerances, the parts of any Johnson Semi-Automatic Rifle are interchangeable with the parts of any other of the same caliber. It is possible, moreover, to change to a barrel of different caliber in a matter of seconds, provided certain essential dimensions of the cartridge remain the same.

e. Specifications—Standard Johnson Semi-Automatic Military Rifle, caliber .30 M1:

Barrel length	—	22 inches (20 or 24 inches at buyers option.)
Length overall	—	47⅞ inches
Weight	—	Rotary 9½ lbs. Vertical 8¾ lbs.

Action — short recoil with 8-lug rotary bolt.

Feed — built-in rotary feed magazine chargeable from clips or with single cartridges — ten-round capacity, or vertical feed box magazine of optional capacity.

Sights — one piece square post protected military front sight.

Receiver peep rear sight with elevation to 1000 yards and windage adjustment in minutes of angle with clicks.

Stock — two-piece wood or plastic, military semi-pistol grip type.

Finish — standard black.

Bayonet lug — to fit any standard bayonet or Johnson bayonet.

Optional Equipment — barrel handguards (Johnson bayonet handle serves the same purpose).

Sling — standard military sling.

* or more technically "from any standard charger" in that the "clip" is held in guides during loading and is not retained in the magazine.

Section III

DETAILED DESCRIPTION OF THE PARTS OF THE JOHNSON SEMI-AUTOMATIC RIFLE

1. Barrel Group. — This consists of the barrel, front sight assembly, barrel guide collar assembly, barrel locking bushing, and on rifles so equipped, bayonet lug and stacking swivel assembly.

a. The barrel is a standard .30 caliber barrel, but any standard military rifle barrel of any standard caliber is equally adaptable.

b. The sight assembly consists of three parts, the one-piece front sight and protecting ears, and two front sight pins which hold it firmly on the barrel.

c. The barrel guide collar is located 13½ inches from the muzzle (22-inch barrel). It consists of a round bushing with two bearing surfaces, having a lug on the bottom to guide the barrel and prevent its rotation. The guide lug also bears on the barrel recoil spring. The barrel guide collar supports the forward part of the barrel in the receiver. It is held in place by the barrel collar pin.

d. The barrel locking bushing consists of a cylindrical block about 1½ inches in length, having a barrel guide lug on the bottom and a series of abutments and channels inside to engage the lugs of the bolt. It screws on the barrel in the same manner as on M1903 Springfield receiver.

e. The bayonet lug and stacking swivel are integral at their base which is a two-band collar held immovable on the barrel by two bayonet lug collar pins.

NOTE: Including the bayonet lug assembly there are 10 parts in the barrel group.

2. Bolt Group. — This consists of the bolt, the extractor, operating handle assembly, locking cam, link, link pin, firing pin, and two rollers.

a. The bolt is 5 inches long and ⅞ths of an inch in diameter. At the front end are eight circumferential lugs, evenly spaced in nine segments around the head of the bolt, one of which is removed for the extractor. The face of the bolt is conventional.

On the right of the bolt is the "T" slot extractor recess. On the left is the ejector channel. The body of the bolt is of the same diameter as the lugs from a point 7/16ths of an inch back of their bearing faces, so as to present an even surface to the cartridges in the magazine.

The bolt is bored inside to accommodate the firing pin and locking cam. Inside the bolt is the firing pin cam face. At the top center of the outside surface is the camming arm, and just ahead of it, the roller stud (both integral with the bolt). The roller fits on the roller stud and is not removable except in a properly equipped shop.

The right rear face of the camming arm is beveled at an angle of 38°-40°. The left rear face is similarly beveled to operate with the locking cam.

b. The extractor consists of a leaf or tail about 2" long terminating at its forward end in the extracting claw. It sets into the extractor recess and is held in place by the operating handle. A hole is provided at the rear end of the leaf for the operating handle spindle.

c. The operating handle sets into a "T"-slot in the extractor recess above the extractor and locks the extractor in place. The operating handle spindle, under the tension of the operating handle spindle spring, extends through the extractor leaf and into a recess in the bolt, locking the operating handle and extractor in place. The operating handle spindle nut retains the spindle and spring in their recess within the operating handle.

d. The locking cam, which is set into the rear of the bolt, has a cam on the upper side which bears on the camming arm of the bolt, and just behind this, a roller stud (integral with the locking cam). The roller fits on the roller stud and is not removable except in the shop. A hole is provided at the rear of the locking cam for the link pin. The locking cam is bored inside to accommodate the firing pin.

NOTE: The rollers on the locking cam and bolt are not indispensable. They merely serve to make the action smoother.

e. The link, 8½ inches long, is bifurcated at the forward end to allow the hammer to swing through it. Through the bifurcation are holes for the link pin, which attaches the link to the locking cam. The link pin is recessed in its center to permit the firing pin to hold it in place.

f. The firing pin has a cam at its center which operates against the firing pin cam face within the bolt.

NOTE: Including the spindle, nut, and spring in the operating handle, and the two undismountable rollers, there are 12 parts in the bolt group.

3. Stock Group.

I. Rotary Magazine Type. — This consists of a military-type wood or composition butt stock, inletted for the hammer and receiver assemblies; a mainspring tube, main spring, main spring follower, 2 positioning screws, and the buffer spring assembly located in a hole bored from tang to butt; the butt plate, and two screws. The rear sling swivel is screwed into the stock. The forestock is held to the forward end of the receiver by two screws. A wooden hand guard may be furnished to cover the upper half of the receiver, and wooden handguards may be attached to the barrel, if desired. When used, the handguards are held in place by bands.

II. Vertical Magazine Type. — This consists of a one-piece military type wood or composition stock, inletted for the receiver and hammer assemblies and breeched on its under side about 4 inches forward of the trigger guard to accommodate the magazine guides and magazine. It is held to the receiver by two screws on the under side forward of the magazine well, and to the hammer block by the front trigger guard screw.

All other parts in this group are the same as in **3. I.**

NOTE: There are 27 parts in the stock group.

4. Hammer Group.

I. Rotary Magazine Type. — This consists of the hammer block, hammer assembly, trigger and sear assembly, safety lock and trigger guard assembly and bolt catch.

a. The hammer block, holding all of these parts, is held in the butt stock by the hammer block screw and the front trigger guard screw. It fits into grooves in the receiver, sliding on from the rear, and is retained in its normal position by the transverse hammer block retaining pin. This pin also holds the bolt catch.

b. The hammer, having double lips on its head, pivots from its base on the hammer pin in the forward end of the hammer block. To it is attached the hammer strut, held in place by the hammer strut pin. The hammer spring is compressed on the tail of the hammer strut against a shoulder in the hammer block.

c. The sear is set into a channel in the bottom of the hammer block, and consists of two sear lips and an extension to the rear which is connected to the trigger by the trigger sear pin. The sear spring fits into a recess in the rear of the sear extension, and is compressed against the rear wall of the hammer block. The trigger is held in the rear of the hammer block by and pivots on the trigger pin.

d. The safety lock assembly consists of the safety lock bushing which engages the sear and the safety lock spindle which connects the safety lock bushing in the floor of the hammer block with the safety lock lever on the front of the trigger guard. A spring actuated plunger in the safety lock lever engages two very shallow recesses in the under surface of the trigger guard, holding the safety lock in the "safe" or "fire" position. The rear trigger guard screw is a wood screw, and does not engage the hammer block.

II. Vertical Magazine Type. — This consists of the hammer block, hammer assembly, trigger and sear assembly, safety lock and trigger guard assembly and magazine catch assembly.

a. The hammer block, holding all of these parts, slides onto the receiver from the rear and is held in the normal forward position by the hammer block retaining pin. It is not removable with the stock.

b. At the forward end of the hammer block is the magazine catch assembly, consisting of the magazine catch, pivoting on the magazine catch pin, and under the tension of the magazine catch spring. The rear magazine guide is part of the front end of the hammer block.

c. Hammer assembly, trigger and sear assembly, and safety lock and trigger guard assembly are the same as in **4 I.**

NOTE: There are 22 parts in the hammer group.

5. Receiver Group.—This consists of the receiver, bolt stop assembly, barrel recoil spring and latch assembly, ejector assembly, sling swivel assembly, rear sight assembly and magazine assembly.

a. Receiver.

I The rotary magazine type receiver is 20 inches overall in length. At its forward end it contains the barrel assembly, and in its after end, the bolt group. The portion containing the barrel is drilled with a number of $\frac{3}{8}$" holes to allow for air circulation and barrel heat radiation. An ejector recess is provided on the outer left side of the bolt housing, and the cam channel and camming arm unlocking face are cut in the inner upper surface of the bolt housing. In the floor of the bolt housing are the feed lips and on the right side below the ejection port is the clip seat (all integral with the receiver). The under side is drilled to receive the two magazine pins.

II The vertical magazine type receiver is similar in all respects to the rotary type except for around the bolt housing. There are no magazine pin holes, no clip seat, and no feed lips. The magazine well is straight sided and open at the bottom to receive the box magazine, and a forward magazine guide projects downward about $1\frac{1}{2}$" from the receiver at the forward end of the magazine well.

b. The bolt stop fits into the rear end of the receiver and serves to arrest the rearward motion of the bolt. It is held in place by the bolt stop plate, which fits in two vertical channels in the rear of the receiver and is locked in place by the bolt stop plate plunger which is under the tension of the bolt stop plate plunger spring. The tail of the bolt stop plate serves as tang cover.

c. The barrel recoil spring and latch assembly consist of the barrel latch body, about $2\frac{1}{2}$" long, which retains the recoil spring plunger, barrel recoil spring, and the recoil guide pin. The barrel latch body is hinged on a pin at the forward end of the receiver and lies in the barrel guide collar lug channel. The swinging end is retained in the receiver (when locked) by the latch plunger engaging a hole in the receiver. The latch plunger is retained in its recess in the barrel latch body by the latch plunger pin, against the tension of the latch plunger spring.

d. The ejector fits in the ejector recess in the left side of the receiver, and is held in place by, and pivots on the ejector pin.

e. The sling swivel adapter is held in the forward end of the receiver, just ahead of the barrel latch hinge pin by a riveted head pin. The sling swivel pivots on the sling swivel pin which passes through the adapter.

f. The rear sight assembly consists of the rear sight leaf, dovetailed into a dovetail slot on the top of the receiver; the notched rear sight elevator, sliding under the rear sight leaf. The windage screw, supported at both ends by the protecting ears (integral with the rear sight leaf) is threaded through the base of the rear sight peep. It is operated by the windage knob, which is attached to the right end of the windage screw by the windage knob pin. The windage knob plunger, in its recess in the windage knob, and under the tension of the windage knob spring produces the minute of angle "clicks" and offers resistance to turning of the windage knob by bearing on the outer surface of the right protecting ear. The rear sight peep is held in place by the windage screw, and travels in a transverse channel in the top of the rear end of the rear sight leaf.

g. The Magazine Assembly.

I The rotary magazine is attached to the under side of the receiver by one transverse and one longitudinal pin. The tapered cylindrical magazine body has a charging port in its upper right surface, immediately below the ejection port. The charging port is closed by the magazine cover which hinges on the magazine cover pin and is held shut by the magazine cover spring. The follower, rotating on the follower shaft (in

the axis of the magazine body) and actuated by the follower spring, serves to feed the cartridges into the feed lips in the receiver floor. A cam on the rear end of the follower shaft engages the bolt catch when the last round has been fired, and cams it up to hold the bolt open.

II The vertical magazine assembly consists of the magazine catch assembly (see hammer group) the forward magazine guide (integral with the receiver) and the magazine. The magazine is a single column vertical feed detachable box. made from light pressed steel and consists of the one piece body, the floor plate, follower, and spring. It is a complete unit, and is **not** part of the rifle.

NOTE: There are 39 parts in the rotary magazine receiver group, and 30 parts in the vertical magazine receiver group.

Section IV

OPERATION

6. To load and fire the rotary magazine rifle.

a. The operation of charging the ten-round capacity rotary magazine may be carried out with the bolt open or closed, or with cartridges already in the magazine. The magazine is charged from standard clips (chargers) or it can be charged by inserting individual rounds one at a time.

b. The hinged magazine cover is situated on the right side of the receiver just below, and parallel to, the ejection port. The charging port is equipped with clip seats (charger guides) into which the clip is inserted horizontally.

The cartridges are stripped from the clip and pressed into the magazine in the usual manner by the even pressure of the thumb of the right hand. The cartridges load counter clockwise and feed clockwise. (Figs. 1 and 2).

c. When the last round has been stripped from the clip, or as each individual round is inserted in single cartridge loading, or when the clip is removed, irrespective of the number of rounds remaining in it, the magazine cover spring returns the magazine cover to the closed position.

The top cartridge is held in position in the feed lips by the guide ramp which is part of the inside face of the magazine cover, and by the pressure of the tension spring-actuated follower on the cartridges below.

d. If the rifle has been firing, the bolt will have been held open by the bolt catch, actuated by a cam on the rear end of the magazine follower shaft. To load the first round from the magazine into the chamber, pull the operating handle 1/16th of an inch rearward and release it, allowing the bolt to move forward into the locked position, carrying the top round from the magazine into the chamber.

e. If the rifle has not been firing, the bolt will be closed and the hammer uncocked. Raise the operating handle 20°, pull it back to its fullest extent and release it. The bolt will move forward into the locked position carrying the top round from the magazine into the chamber.

f. The rifle is now loaded, cocked, and ready to fire. The rifle fires at each pressure of the trigger. It may be fired as fast or as slowly as required.

NOTE i: If after loading the magazine with the bolt open, it is required that the bolt be closed with the chamber empty, depress the magazine cover with the third finger to prevent the top cartridge from entering the feed lips and release the operating handle. The bolt will move forward into the locked position on an empty chamber.

NOTE ii: The magazine can be so designed that the bolt will be released automatically when the magazine is loaded. It is, however, believed to be undesirable to design a magazine which will permit the automatic chambering of a round. The loss of time in pulling back the operating handle 1/16th of an inch is insignificant.

7. To load and fire the vertical magazine rifle.

a. The magazine must first be removed from the rifle. Press forward the magazine catch with the thumb of the right hand, releasing the magazine and allowing it to slip into the palm of the hand.

b. The magazine is charged by depressing the magazine follower with the base of a round and sliding the cartridges individually under the incurving shoulders (feed lips) of the magazine, where they are held in place by the upward pressure of the magazine spring under the follower.

c. Insert the loaded magazine in the magazine guides and press it smartly upward into the rifle until it is engaged by the magazine catch. The magazine is inserted with the bolt closed, as the bolt does not remain open after the last shot is fired.

d. To cock the rifle and chamber a round, proceed as in **6 e** above.

8. To operate the rifle as a single loader.

a. Raise and pull back the operating handle to its fullest extent, so that the bolt will engage and be held open by the bolt catch. Insert a round through the ejection port. Depress the magazine cover and pull back the operating handle 1/16th of an inch and release. The bolt will move forward chambering the round. On vertical magazine rifles, the bolt must be held back manually while the round is introduced through the ejection port. The rifle is now loaded, cocked, and ready to fire. When the rotary magazine rifle is fired, the bolt will be held open by the bolt catch, allowing another single round to be inserted.

9. To unload the rotary magazine rifle.

a. To empty the magazine, depress the magazine cover to its full extent with the thumb of the right hand. The cartridges are forced by the follower into the palm of the hand.

b. Clear the gun by pulling back the operating handle to its fullest extent, extracting the unfired round from the chamber and ejecting it through the ejection port.

c. To close the bolt when the rifle is empty, depress the magazine cover, pull back the operating handle and release it as described in **6 d** above.

10. To unload the vertical magazine rifle.

a. Remove the magazine as in paragraph **7 a.**

b. Clear the rifle as in paragraph **9 b.**

11. To adjust the rear sight.

a. To elevate the rear sight, slide the rear sight elevator rearward with the thumb and forefinger. To facilitate movement, raise the end of the rear sight leaf with the third finger of the right hand while sliding the rear sight elevator rearwards, (Fig. 3). Each notch on the rear sight elevator represents two minutes of angle.

b. To adjust for windage, turn the windage knob at the right of the rear sight. Each full rotation of the windage knob gives two clicks. Each click represents two minutes of angle.

NOTE: When using U. S. caliber .30 M1 ammunition, each minute of angle change in elevation or windage changes the center of impact one inch for each 100 yards of range. Suitable allowance must be made for ammunition of other velocities and trajectories.

12. Safety precautions.

a. While any cartridges remain in the magazine after a round has been fired, the rifle is ready to fire. There is, moreover, no visible indication whether the rifle is cocked or uncocked.

The operator must be impressed with the fact that a rifle with the bolt closed is not known to be safe until the bolt is opened, or when it is positively known to have been cleared. IT SHOULD BE STANDARD PROCEDURE TO CLEAR THE RIFLE IMMEDIATELY BEFORE HANDLING ANY WEAPON.

b. The safety lock lever is located immediately in front of the trigger guard. When the free end of the lever lies at an angle to the right of the barrel axis, the sear is positively locked and the rifle is at "SAFE" and cannot be fired. When the lever lies at an angle to the left of the barrel axis, the safety is "OFF", and the rifle ready to fire.

Section V

FUNCTIONING

13. Action during recoil

a. When the rifle is loaded as described in Par. **6** and **7**, the hammer spring has been compressed and the sear is engaged in the lip of the hammer, holding it in the cocked position.

b. Ignition.—When the trigger is pressed, the sear disengages from the lip of the hammer. The hammer spring drives the hammer against the firing pin which is protruding slightly from the rear of the locking cam and explodes the primer of the cartridge.

NOTE: Because the firing pin cam is opposed by the firing pin cam face within the bolt, it is impossible for the firing pin to move forward to come in contact with the primer of the cartridge until the bolt has rotated to the fully locked position. The rifle cannot be discharged until the bolt is fully locked.

c. Recoil and Unlocking.—As the bullet travels through the bore, the barrel, which has been held in the forward position by the tension of the barrel recoil spring and of the main spring (transmitted through the bolt) begins to recoil against the tension of the springs. This recoil does not become apparent until the bullet has left the muzzle. The muzzle blast is the primary operating force of the action.

When the bullet is at the muzzle, the barrel has moved rearward about 1/64th of an inch. When the bullet is about 2 feet from the muzzle, the barrel has recoiled about 1/8th of an inch. At this point the camming arm on the bolt engages the camming face in the receiver, and unlocking begins. When the bullet is about 5 feet from the muzzle, the barrel has recoiled its full 3/8ths of an inch and the bolt has been rotated through 20° to the unlocked position by the action of the camming arm against the camming face. The rearward motion of the barrel is arrested by a shoulder in the receiver.

d. Extracting.—The bolt, being unlocked from the barrel, jumps away from the chamber actuated by momentum and the residual pressure in the chamber. The extractor claw engaged in the cannelure of the cartridge case gives the empty case a sharp pull, effectively loosening it in the chamber. At the same moment the bolt receives a sharp blow from the locking cam, which due to the impetus received during the rotation of the bolt taps the bolt rearward.

NOTE: There is enough residual pressure in the chamber to give appreciable assistance to extraction by blowing the loosened case from the chamber.

e. Retracting.—The initial impetus given to the bolt by the barrel recoil and the force of residual pressure causes the bolt to be forced back in its channel in the receiver, cocking the hammer and compressing the main spring.

f. Ejecting.—Further movement of the bolt traveling to the rear in the receiver brings the base of the empty case in contact with the ejector, which throws the case clear of the receiver through the ejection port at an angle of 45°. The bolt is finally halted in its rearward travel by the forward end of the link bringing up against the bolt stop, when the head of the bolt has passed behind the base of the top cartridge in the magazine.

NOTE: Except that the ejector key is heavier and stronger, ejection is similar to that in the U. S. Rifle Model '03, the British SMLE, and the Mauser.

14. Action during counter recoil

a. As the bolt moves forward, actuated by the compressed main spring, the lower part of the face of the bolt comes in contact with the base of the top cartridge in the magazine and carries it into the chamber. The locking lugs enter the barrel locking bushing and the locking cam causes the bolt to rotate through 20° to the locked position.

b. The trigger must be released after each round is fired to allow the rear sear lip to engage the rear hammer lip.

c. The rifle is ready to be fired again and the cycle described above is repeated each time the trigger is pressed except when the magazine has been emptied.

On rotary magazine rifles, when the magazine is empty and the last round round has been fired, the cam on the rear end of the follower shaft raises the bolt catch which holds the bolt open against the pressure of the main spring.

Section VI

DISASSEMBLING AND ASSEMBLING

15. General Information.—The Johnson Semi-Automatic Rifle can be stripped to its main component parts with no tools other than the point of a bulleted round, the screwdriver blade which is part of the operating handle, and the point of the firing pin. A screwdriver and any pointed instrument such as a punch, marlinspike, or even a common nail are equally effective. These simple and available tools are sufficient for all the disassembling which could possibly be necessary for the operator to perform in the field or in barracks, either for cleaning, for remedying stoppages, or for replacing worn or broken parts.

The only disassembling normally required by the operator consists or removing the barrel for cleaning after firing, and occasionally removing the bolt group for cleaning prior to inspections, etc.

Such an operation as the removal of the barrel locking bushing from the barrel requires the use of a vise and wrench. To remove the barrel guide collar a drift and a copper or wooden mallet must be available. Such extensive stripping, however, should not, in any rifle, be permitted in unskilled hands. This section contains complete instructions for the guidance and information of ordnance specialists and technical authorities.

BEFORE BEGINNING TO DISASSEMBLE THE RIFLE EMPTY THE MAGAZINE AND MAKE SURE THAT THE CHAMBER IS EMPTY.

16. Dismounting the Barrel Group.

a. Grasp the rifle in the left hand at the point of balance.

b. With the point of a bulleted round compress the latch plunger of the hinged barrel latch by inserting the point of the bullet into the hole provided in the right side of the forward end of the forestock, and push the barrel rearward. The barrel latch will fall downward on its hinge. (Fig. 4).

c. Raise the operating handle with the thumb of the left hand to the unlocked position and withdraw the barrel from the receiver. (Fig. 5).

NOTE i: As the bolt is normally locked to the barrel, the latter cannot be withdrawn without unlocking the bolt.

NOTE ii: Time for dismounting barrel, four seconds.

d. Further stripping of the barrel is normally unnecessary and cannot be carried out without more elaborate equipment. The sequence however is continued as follows:

i. To remove the barrel locking bushing, place the barrel in a vise and unscrew with a wrench.

ii. To remove the front sight, drive out the two front sight pins and drive off the sight.

iii. To remove the barrel guide collar, drive out the barrel collar pin and drive off the collar with a wooden mallet or brass block.

17. Removing and Disassembling the Bolt Group.

a. Disengage the bolt stop plate plunger with the point of a bulleted round and lift out the bolt stop plate. (Fig. 6).

b. Remove the bolt stop. (Fig. 7).

c. Disengage the link from the main spring plunger. (Fig. 8).

d. Raise the operating handle and retract the bolt about two inches. With the thumb and forefinger of the right hand, grasp the knob of the operating

handle spindle and pull it outward to its fullest extent. Slide the operating handle forward until it is clear of the shoulders in the extractor recess and remove it. Lift out the extractor.

NOTE: The operating handle should be regarded as a single part, but should it be necessary to disassemble it, merely unscrew the operating handle nut and allow the plunger and plunger spring to fall into the hand.

e. Grasp the projecting end of the link and pull it to the rear, withdrawing the bolt through the rear end of the receiver. (Fig. 9).

f. Rotate the locking cam counter clockwise and withdraw it from the bolt.

g. Withdraw the firing pin.

h. Push out the link pin and remove the link.

NOTE i: Any operator should be able to remove and disassemble the bolt group. Time—ten to fifteen seconds.

NOTE ii: It is possible, with the barrel dismounted, to remove the bolt through the forward end of the receiver. This is not desirable, as replacing the bolt in the receiver from the front is difficult. The operation is carried out as follows:

a. Raise the operating handle and retract the bolt about two inches, holding it back against the tension of the main spring with the forefinger of the left hand on the bolt face.

b. Remove the operating handle and extractor as in **17 d** above.

c. Depress the forward end of the rifle and clear the bolt gradually, allowing the bolt to slide through the receiver into the palm of the right hand.

d. Disassemble the bolt as described in **17 f, g, h,** above.

18. Removing and Disassembling the Stock Group.

I. Rotary Magazine Type.

a. Disengage the bolt stop plate plunger with the point of a bulleted round, and lift out the bolt stop plate. (In order not to lose the bolt stop, it is advisable to remove it at this point.) (Figs. 6 and 7).

b. With the point of a bulleted round disengage the hammer block pin, and push it out with the point of the cartridge. (Fig. 10).

c. Grasp the rifle with the left hand at the point of balance, turn the weapon on its side and pull off the butt stock group. (Fig. 11).

d. Remove the ejector pin and ejector.

NOTE i: The above operation can be accomplished with the rifle in a completely assembled condition.

NOTE ii: The removal of the hammer block pin effects the disengagement of the bolt catch. When the butt stock group has been withdrawn from the receiver, the bolt catch should be lifted from the hammer block.

NOTE iii: The hammer should be cocked before removing the butt stock group.

NOTE iv: Care must be taken to avoid losing the ejector and pin in removing the stock.

e. Unscrew the front trigger guard screw and the hammer block screw and lift out the hammer group from the stock. Unscrew the rear trigger guard (wood) screw and remove the trigger guard and safety assembly. (Disassembling of the hammer group is set forth in Par. **19.**)

f. Remove the forestock screws and detach the forestock.

g. Unscrew the butt plate screws, and remove the butt plate.

h. Unscrew the mainspring tube screw and remove the buffer assembly, mainspring follower, and mainspring.

NOTE i: The buffer assembly should not be removed by the operator. It is not in any way essential to the functioning of the rifle and it is almost impossible for this assembly to get out of order. Disassembling of this unit can be done in the armory if absolutely necessary.

i. Unscrew the two screws which retain the mainspring tube positioner, and withdraw the mainspring tube.

NOTE i: The mainspring tube should be removed only under the most unusual conditions. It should really be regarded as an integral part of the stock, and for purposes of cleaning, it can be treated in exactly the same fashion as the bore of the rifle barrel.

II Vertical Magazine Type.

a. Remove the bolt stop plate and bolt stop as described in **18 I, a.**

b. Unscrew the two forward stock screws and the front trigger guard screw with the blade of the operating handle or screwdriver.

c. Separate the stock from the receiver.

d. Unscrew the rear trigger guard (wood) screw and remove the safety lock and trigger assembly. (This is part of the hammer group.)

e. Complete the disassembling of the stock as described in **18 I, g, h, i.**

19. Removing and Disassembling the Hammer Group.

I Rotary Magazine Type.

a. The hammer group being removed from the butt stock as described in **18 I, e** above, press the trigger and release the hammer slowly against the thumb.

b. Push out the hammer pin and lift out the hammer. The hammer strut and hammer spring will come out with the hammer.

c. Push out the hammer strut pin, and remove the hammer strut from the hammer. The hammer spring is pulled off from the tail of the hammer strut.

d. Push out the trigger pin and the sear stop pin, slide the sear forward and lift it up from the hammer block.

e. Push out the trigger sear pin, and remove the trigger from the sear.

f. Remove the sear spring from its recess in the rear end of the sear.

g. To disassemble the safety lock and trigger guard assembly, drive out the safety lock lever pin, drive off the safety lock lever, and remove the spindle, being careful not to lose the safety lock plunger and spring, which will fall out of their recess in the safety lock lever when the latter is removed. Remove the safety lock bushing from its recess in the floor of the hammer block.

NOTE: The safety lock assembly should not be removed from the trigger guard by the operator except under very unusual circumstances.

II Vertical Magazine Type (stock removed).

a. Push out the hammer block retaining pin and slide the hammer block to the rear out of its channels in the receiver.

NOTE: The hammer must be cocked before removing the hammer block.

b. Push out the magazine catch pin and remove the magazine catch and magazine catch spring.

c. Pull the trigger and release the hammer.

d. Disassemble the remaining parts as described in **19 I, b, c, d, e, f, g.**

20. Disassembling the Receiver Group (stock removed).

a. With the point of a cartridge disengage the bolt stop plate plunger, lift up and remove the bolt stop plate. (Fig. 6).

b. Remove the bolt stop. (Fig. 7).

c. Push out the ejector pin and lift out the ejector.

d. Remove the barrel recoil spring and latch assembly. Drive out the barrel latch pin, drive out the latch plunger pin and remove the latch plunger and latch plunger spring. Drive out the recoil guide pin and remove the recoil spring plunger and barrel recoil spring.

NOTE: Disassembling of the barrel recoil spring and latch assembly should not be done in the field. This operation should be confined to the armory. It is highly improbable that this assembly will require any special attention on the part of the operator. Moreover, the weapon will function under normal conditions without the aid of the recoil spring. If for any reason the latch plunger should fail to hold the assembly in its normal position, any temporary expedient such as a piece of wire, a wooden match, a nail, or other similar device can be resorted to in an emergency.

e. To remove the rear sight elevator, lift up the rear sight leaf and remove the elevator from its track on the top of the receiver.

f. To remove the rear sight leaf, with a wooden block or a soft brass rod, drive the base out of its dove-tailed slot in the receiver.

g. Remove the windage screw and aperture assembly. Drive out the windage knob pin and pull off the windage knob. The windage knob plunger and windage knob spring will fall out of their recess in the windage knob when this is removed. Remove the windage screw, at the same time disengaging the rear sight peep or aperture.

NOTE: Disassembling of the windage screw and aperture assembly should not be done by the operator. The sight leaf should be removed only at the armory.

h. On rotary magazine models, the forestock being removed, drive out the transverse forward magazine retaining pin, and drive out the longitudinal retaining pin on the left side of the receiver, using the point of a cartridge or the point of the firing pin, and remove the rotary magazine assembly from the receiver.

i. Drive out the magazine cover pin, and remove the rotary magazine cover and magazine cover spring.

j. Disengage the rotary magazine follower shaft and remove the follower shaft. follower, and follower spring.

21. Assembling the Receiver Group.—Follow directions in Paragraph **20** in reverse order.

22. Assembling the Hammer Group.—Follow directions in Paragraph **19** in reverse order.

NOTE: The hammer must be cocked before returning the hammer group to the receiver.

23. Assembling the Stock Group.—Follow directions in Paragraph **18** in reverse order.

NOTE: On rotary magazine models, the hammer block pin hole and bolt catch pin hole must be accurately lined up before attempting to drive in the hammer block retaining pin.

24. Assembling the Bolt Group.—Follow directions in Paragraph **17** in reverse order.

25. Assembling the Barrel Group.—Follow directions in Paragraph **16** in reverse order.

NOTE: In returning the barrel, it is advisable to raise the operating handle to the unlocked position.

Section VII

CARE AND CLEANING OF THE JOHNSON SEMI-AUTOMATIC RIFLE

26. General.—The Johnson Semi-Automatic Rifle is a weapon of precision. The same care should be accorded to it that is advisable for any military rifle of the manually operated type. Its demands, however, are no greater. It will function without oil, and with dirt, sand, and mud in the mechanism, but normal lubrication with any good rifle oil and a clean mechanism will permit it to function more smoothly. In general, the care and cleaning of the Johnson Semi-Automatic Rifle differs only in detail from that of any standard military rifle.

NOTE: Perhaps it is unnecessary to remark that the ammunition needs no lubrication or special treatment of any kind.

27. Care and cleaning of the barrel.—The barrel does not necessarily have to be removed from the receiver to clean the bore. With the bolt open, a cord pull-through can be passed from breech to muzzle. To reach the abutments of the barrel locking bushing, however, the barrel should be removed. (see Par. **16**.)

28. Care and cleaning of the bolt, receiver, and hammer groups.—A few drops of oil applied to the bolt through the ejection port will improve the smoothness of functioning. To clean the bolt group, disassemble from the receiver. (See Par. **17**).

When the bolt group has been removed for cleaning, clean the inside of the receiver, paying attention to the camming face and cam channel.

The hammer group needs little care. It should be examined occasionally and the parts oiled for smooth operation and as a protection against rust.

Section VIII

SPARE PARTS AND ACCESSORIES

29. General Note.—The parts of any rifle will, in time, become unserviceable through breakage or wear resulting from continuous usage. Based upon firing over 75,000 rounds from Johnson semi-automatic test rifles, one of which alone fired approximately 25,000 rounds, it appears unnecessary, therefore, to burden the operator with spare parts.

30. Accessories.—A bulleted round is the only tool not a part of the rifle which is required to take the rifle down for cleaning.

Section IX

IMMEDIATE ACTION AND STOPPAGES

31. General Note.—To those familiar with the use of firearms, the close relation of immediate action and stoppages is well understood. The former is the unhesitating application of a probable remedy for a stoppage. The latter, infrequent though they are in the Johnson Semi-Automatic, can be almost eliminated by an intimate knowledge of the rifle and a clear understanding of their causes.

32. Table of stoppages and immediate action.—A table of stoppages and the remedial actions is appended:-

Turn Page

TABLE OF STOPPAGES AND REMEDIAL ACTIONS

Stoppage	Position of Bolt Handle	Probable Cause	Immediate Action
1. Failure to fire	Closed, down	a. Defective primer b. Defective firing pin c. Defective hammer spring	a. **Re-load by pulling handle** b. Examine firing pin c. Examine hammer spring
2. Failure to extract Note: If rim of cartridge breaks, remove barrel to facilitate removal of case by hand.	Closed, handle up	a. Defective cartridge b. Defective extractor c. Barrel recoil prevented by foreign matter in barrel sleeve	a. **Re-load by pulling handle** b. Change extractor c. Remove barrel, clear obstruction, and reassemble
3. Failure to eject	Open, handle up, part-way back	a. Defective cartridge b. Obstruction in bolt path c. Rifle full of sand or dirt d. Defective extractor e. Defective ejector	a. **Pull handle for re-loading** b. Remove bolt, clear, replace c. Remove bolt, clean, replace d. Change extractor e. Change or correct ejection
4. Failure to re-load	Open, handle up, part-way closed	a. Defective magazine spring (temporary) b. Same (permanent) c. Rifle full of dirt d. Deformed cartridge	a. **Pull handle for re-loading** b. Repair spring c. Clean dirt d. Pull handle for re-loading

NOTE: Both the barrel recoil spring and the mainspring are manufactured with closed ends. In the event of breakage of either spring, the springs can be removed and the ends turned inwards butting against each other, thus effecting an efficient temporary repair and keeping the rifle in action.

COMPARISON OF THE JOHNSON SEMI-AUTOMATIC RIFLE WITH "MILITARY CHARACTERISTICS FOR SEMI-AUTOMATIC RIFLES"

(NOTE: Under date of September 21, 1938, the U. S. War Department, Office of the Chief of Ordnance, at Washington, D. C., submitted to the Johnson Automatics Trust a two-page mimeographed list (bearing an identification number 6160) entitled "Military Characteristics for Semi-Automatic Rifles". All of the characteristics are contained in the quotations in the following comparison.)

"a. The rifle must be simple, strong, and compact, and adapted to function with the standard caliber .30 ammunition. Weights should be well balanced and so placed that the essential strength is given to components requiring it. Ease of manufacture should be a guiding factor in preparing a design".

Johnson: Functions with M1 (48,000 lbs. per sq. in.), M1906, and M2, (38,000 lbs. per sq. in. plus.) ammunition. Functions without adjustment with pressures from 38,000 lbs. per sq. in. to 68,000 lbs. per sq. in. Has no critical tolerances. Ease of manufacture is the paramount factor of its design. Aside from its slidable barrel, operating parts are all contained in the breech. The mainspring is protected by the butt stock.

"b. The mechanism must be well protected from the entrance of sand, rain, or dirt; and should not be liable to derangements due to accidents, long wear and tear, exposure to dampness, sand, etc."

Johnson: Mechanism is protected. Dirt makes little difference due to design. Has successfully withstood severe sand tests.

"c. Components of the mechanism should be the fewest possible, consistent with ease of manufacture and proper functioning of the weapon. Parts requiring constant cleaning or which may require replacement should be designed with a view to ease of dismounting by the use of not more than one small tool, preferably the service cartridge."

Johnson: Has no parts of a type or class not essential to a repeating arm except mainspring, barrel recoil spring, two cams, semi-automatic sear. If desired, stock screws can be replaced by latches. Barrel easily removed for cleaning.

"d. The rifle must be so designed that the magazine may be fed from clips or chargers. The capacity of the magazine should not be less than five rounds, preferable ten, but not to exceed ten rounds."

Johnson: Equipped with a rotary-feed, ten-shot magazine, chargeable from standard clips or with single cartridges, or with a vertical feed detachable box magazine of optional capacity.

"e. The breech mechanism must be so designed as to preclude the possibility of injury to the firer due to premature unlocking. The firing mechanism should be so designed that the firing pin is controlled by the trigger and sear direct; that is, the bolt mechanism should move forward to the locking or firing position with the firing pin under the control of the trigger and sear mechanism, so that the cartridge is not ignited until the trigger is pulled to release the firing pin. The bolt, or block should remain open when the last cartridge in the magazine has been fired. In case a detachable magazine is used, it should be possible to insert a new magazine with the bolt in either open or closed position."

Johnson: Has a strong breech-end cover or lock plate (bolt stop plate) positively preventing injury. (Premature unlocking is impossible.) The receiver is closed entirely on top and in the rear.

Weapons using hammer mechanism cannot provide a sear-controlled firing pin.

Johnson cannot be fired unless and until the bolt is safely locked. The rifle cannot fire unless the trigger is pulled, releasing the hammer.

Bolt remains open when last shot is fired on rotary magazine rifles. Magazine may be charged at any time with the bolt open or closed. Detachable box magazine may be inserted in the vertical feed rifle at any time.

"f. The trigger pull, measured at the middle point of the bow of the trigger, should be not less than 3 or more than 5 pounds. The trigger action should be similar to that of the present service rifles, i.e.; it should have a light first pull, after which there should be no appreciable backward motion until the sear is released."

Johnson: Can be furnished with 2 to 5 pound pull. Present Johnson pull is designed to overcome anticipation of ignition, or flinching.

"**g.** An efficient safety or locking device must be provided, permitting the rifle to be carried cocked and with cartridge in chamber without danger. The rifle should remain cocked and ready for firing when the safety device is unlocked."

Johnson: So equipped.

"**h.** The weight of the rifle, with magazine empty and without bayonet or sling, should be a minimum consistent with proper functioning and in no case should exceed 9.5 pounds."

Johnson: Weight about 9.5 lbs. (Established with a standard M1903 24 inch barrel.) With lighter barrel weight is reduced by 0.2 lbs. Vertical magazine rifle weighs 8.75 pounds.

"**i.** The rifle must be so designed as to give good balance and be adapted to shoulder firing."

Johnson: Conforms.

"**j.** The rifle is to be strictly semi-automatic, that is: a self-loading type, and is not to function as an automatic rifle. The trigger mechanism should be so designed that it will be impossible to fire more than one shot with each pull of the trigger; the trigger must be released and pulled again for each successive shot."

Johnson: Conforms.

"**k.** The accuracy of the rifle should be comparable with that of the present service shoulder rifle."

Johnson: Conforms. The Johnson semi-automatic rifle is fully as accurate as the M1903 Springfield.

"**l.** The stock should be so designed, if practicable, as to allow ventilation of the gun without charring or overheating the wood."

Johnson: Barrel so well ventilated that 2400 successive rounds fired in less than 1½ hours did not put barrel out of action, nor gun out of action, nor was the wood at all charred.

"**m.** The rifle should be capable of being used as a hand functioning arm in case the self-loading feature is disabled. The bayonet should be so attached as not to interfere with the proper operation of the piece under any conditions that may normally be expected."

Johnson: Excellently adapted for hand operation. If the barrel is prevented from recoiling, the arm works like a Springfield M1903. This has been proved by burying this arm in sand, and then removing and firing it. Barrel can be blocked and V-B. rifle grenade fired, as in the M1903 rifle. Bayonet attached to the barrel does not affect functioning.

"**n.** The use of special high-grade material, highly specialized heat treatment, or special grade machine work or finish in general should not be required."

Johnson: Any chromium-nickel steel such as S.A.E. 3140 or 4650, ordinary spring wire. No special steels. Conventional heat treatment. Conforms.

"**o.** The use of special oil or grease or any other material not readily obtainable in the field should not be necessary to the proper functioning of the piece."

Johnson: Not only requires no special oil or grease, **but** can function and has functioned for appreciable intervals without any oil or lubricant of any kind whatever. (2900 continuous rounds without cleaning or oiling mechanism.)

"**p.** The use of special tools for adjustment, dismounting, or assembling should be reduced to the minimum."

Johnson: No special tools required, except the point of a cartridge and the screw driver blade on the end of the operating handle. Or "Boy Scout" knife blades may be used if available. Use the firing pin to push out pins.

"**q.** Sights should be over the center of the bore and so firmly fixed as to avoid any possibility of variation in position due to constant firing or rough handling."

Johnson: Conforms. Sights extremely rugged and well protected.

"**r.** The rear sight should be not less than 2½ inches and not more than 6 inches from the eye when using the weapon in the prone position. It should be graduated up to 1000 yards and have a windage adjustment, equivalent to that on the sight of the U. S. rifle caliber .30 M1903. In case a sight embodying the above points is not devised by the designer, the rifle should be constructed as to permit the installation of such a sight."

Johnson: Any sight desired. Johnson sights conform to this requirement.

The following additional requirements for a military semi-automatic arm are submitted by the Johnson Automatics Trust as being worthy of consideration, especially

in a comparison between two or more types of semi-automatic rifles. These requirements were set up by the inventor in his development of the Johnson Semi-Automatic Rifle.

I. If possible, the barrel should be easily removable by a soldier in the field for cleaning, inspection, or in the event of over-heating, or in the event that it becomes necessary to exchange a worn barrel for a new one.

II The chamber of the barrel should be readily accessible from the breech end, so that it may be cleaned by any ordinary means. The barrel should be capable of being cleaned from the breech end, instead of only from the muzzle.

III The breech locking mechanism should be sufficiently strong to withstand the maximum pressures developed in the caliber .30 M1 ammunition, and preferably should be sufficiently strong not only to stand these pressures, but also to withstand pressures which may develop in the the near future in service ammunition, or pressures up to 65,000 — 70,000 lbs. per sq. in. (In view of the possibility that at a later date higher velocity, flatter trajectory, higher pressured ammunition may be developed, it is believed to be desirable that the mechanism should be built with the future adoption of such ammunition in mind).

The Johnson Semi-Automatic Rifle conforms to these three self-imposed requirements.

TEST PERFORMANCES OF THE JOHNSON SEMI-AUTOMATIC RIFLE

1. Endurance Tests.—Various tests, some harsh in the extreme, have been carried out to discover, if possible, at what point the Johnson Semi-Automatic Rifle actually breaks down. The Johnson Automatics Trust, however, cannot say what is the ultimate limit to the functioning capabilities of the Johnson Semi-Automatic Rifle.

NOTE: All performances quoted took place before witnesses. As a matter of policy, the names of officials and official places must be omitted. All tests were carried out with caliber .30 service ammunition.

a. Approximately 75,000 rounds have been fired in tests since the rifle was invented in 1936. One rifle, MN1, cal. .30, fired approximately 25,000 rounds between January and December 1938. It is still functioning.

b. Endurance firing.—Johnson rifle, MN3, fired 500 rounds, at 30 rounds per minute, without cleaning or oiling. The rifle barrel was then arbitrarily cooled. The chamber and bore were cleaned but the mechanism was not lubricated. This rifle then fired 2400 rounds at the rate of 25 to 80 rounds per minute.

The total of 2900 rounds was fired in two hours. The last 2400 rounds were fired in less than ninety minutes. Several hours later, without cleaning or oiling, the rifle was still firing successfully.

c. Firing without lubrication.—Johnson MN1, cal. .30, beginning in a cleaned but unoiled condition, fired over 500 rounds without any lubrication.

d. Firing with sand in chamber.—Johnson MN1 on a number of occasions has been fired with sand in the chamber. This rifle has functioned automatically for six consecutive shots with sand on each shell. Twenty-four successive sand-covered rounds were fired and extracted but not ejected. Functioning was obtained by working the operating handle manually.

e. Firing with sand in action.—Johnson MN1 was buried in sand, removed, and the barrel cleaned to avoid bursting it. The rifle functioned easily by hand operation. Placed in a sand box equipped with a blower for three minutes and then removed, it functioned automatically. Rifle MN1 fired 250 consecutive rounds in an artificial sand storm.

f. Firing with mud and sand in action.—Johnson MN1 was placed in a mud bath for five minutes, after which it functioned normally. Without being cleaned or dried it was at once put in a sand box. This rifle continued to function notwithstanding this unusual treatment.

g. Firing with variations in pressure.—The normal pressure of caliber .30 M1 ammunition is 48,000 lbs. per square inch. Rifle MN1 fired 600 continuous rounds with standard pressure. Then, without adjustment, 600 continuous rounds were fired with loads giving 37,000 lbs. per sq. in. The barrel in this rifle had already fired 10,000 rounds when the above test was conducted.

On a previous occasion, rifle MN1 fired every available commercial .30-'06 load. A proof load or 68,000 lbs. per sq. inch was then fired. It functioned with all loads.

Johnson MN4 has functioned with pressures as low as 35,000 lbs. per sq. inch.

Rifle MN1 has on many occasions been fired with heated cartridges developing excessive pressures.

h. Firing with rifle elevated and depressed.—Johnson rifles function at angles to 90° elevation and depression.

i. Firing to establish point of overheating.—Johnson rifle MN3 was not overheated to the point of breaking down after firing 2400 rounds in less than ninety minutes. The rate of fire averaged 25-30 shots per minute for 1600 rounds, and was increased to 80 shots per minute for the last 400 rounds.

The M1903 Springfield barrel was, of course, badly worn from this firing.

j. Firing to determine pre-ignition.—A round left in the chamber, after 2400 rounds had been fired in less than ninety minutes, exploded and was extracted by pre-ignition. Rounds left in the chamber after firing 150 rounds in three minutes did not pre-ignite. Moreover, they were ejected when fired after being cooked in the chamber for four minutes.

2. Incidence of stoppages.—Previous attempts to produce a satisfactory semi-

automatic rifle have brought to light various serious faults in functioning which have appeared to be inescapable. They seem to have been successfully eradicated in the Johnson.

a. Rifle MN1 fired 300 consecutive rounds of 1918 (war time) U. S. C. Co. .30-'06 ammunition without stoppage of any kind.

b. Rifle MN3 (having just fired 757 rounds without cleaning or oiling) fired 627 consecutive rounds at a rate of about 30 rounds per minute without any stoppage of any kind. This rifle at this same time fired 895 consecutive rounds with one failure to feed, the rifle having just fired 500 rounds without cleaning or oiling. In a total of 895 consecutive rounds of continuous fire there was but one feed failure.

c. MN3 fired 500 rounds with a headspace in excess of 0.045 inches. (A headspace of 0.010 inches is considered the absolute maximum for bolt action rifles.)

d. A common cause of malfunction in semi-automatic rifles is the breakage of cases owing to the jerk in extraction. Certain experimental ammunition was found having cases which had been excessively annealed and hence were extremely difficult to extract.

Johnson MN3 fired 247 consecutive rounds of this ammunition without any stoppage at a rate of 30 rounds per minute.

3. Tests of Accuracy.—A professional factory tester firing from a bench rest with iron sights at 50 yards obtained five shot groups averaging between three quarters of an inch and one inch in diameter. Fired prone, with sling and both with and without forearm rests, average riflemen have found no difficulty in making perfect scores on a ten inch bull's eye at 200 and 300 yards.

The following are detailed scores:-

Johnson pilot model rifle, M1903 barrel with a history of 8,000 rounds. 1918 cal. .30-'06 U. S. C. Co., Ammunition.

Bull's eye	Range	Score
10"	300	25 consecutive bull's eyes
20"	500	20 consecutive bull's eyes

In rapid fire the following range scores have been made. Johnson MN2, 22" Remington barrel, Winchester Cal. .30-'06 ammunition, prone, no sling, iron sights.

200 yards	5 rounds in 5 seconds	7" group
200 yards	10 rounds in 14 seconds	10" group

Johnson MN3, M1903 8000-round barrel, prone with sling, no rest, 1918 .30-'06 U.S.C. Co., Ammunition.

300 yards 10" bulls 12 rounds in 24 seconds
5, 5, 4, 5, 5, 4, 5, 5, 4, 5, 5, 5.

NOTE: The four (inner) ring was 24" diameter.

500 yards 20" bulls 3 rounds in 6 seconds 5, 5, 5.

Johnson Proof Model No. 1 (MR1) Winchester caliber .30 M70 barrel, prone with forearm rest, no sling, standard iron sights, standard boat-tail ammunition:

200 yards	10" bulls	7 shot frame	3x3 inch groups
200 yards	10" bulls	5 shot group	3x3 inch groups

Johnson Proof Model No. 2 (MR2) conditions same as above:

200 yards	10" bulls	5 and 7 shot groups	4x4 inch groups
200 yards	10" bulls	7 shots in 14 seconds	7x4 inch groups

4. Recoil and Fatigue Effect on the Operator.—It is known that the recoil of the Johnson Semi-Automatic Rifle is largely absorbed in operating the mechanism. Indeed, the rifle has been held like a pistol at arm's length in one hand and fired automatically without difficulty. Beyond the muscular strength necessary to hold a nine-pound rifle at arm's length, this feat requires no peculiar ability.

a. It was decided, however, to determine the effect on the operator, if any, of prolonged rapid fire. An individual weighing about 155 pounds fired 800 rounds of Cal. .30 M1 ammunition, without pads, in less than eighteen minutes, an average rate of fire of about forty-five rounds a minute. There was no bruising of the shoulder and no complaint of fatigue.

5. Cyclic rate of fire, theoretical.—According to data obtained from high-speed moving pictures, the theoretical cyclic rate of the Johnson is 600 r.p.m. The bolt recoil

phase takes 36/1000ths of a second. The counter recoil phase takes about 64/1000ths of a second. The cycle is completed in 1/10th of a second.

6. Deliverable rate of fire.—Eight shots have been fired, unaimed, in two seconds; ten shots in two and one-half seconds. The maximum rate of deliverable aimed fire in any semi-automatic rifle is about one shot per second. or normally about 30-40 shots per minute. 100 aimed shots have been fired from a Johnson rifle in 100 seconds.

7. Field demonstration of interchangeability of parts.—Johnson rifle MN1 was completed in January, 1938, from earlier tentative drawings having no established limits. Rifle MN3 was made after MN1 was out of the factory. No attempt was made to have the parts interchangeable.

After MN3 had fired 2900 rounds in two hours, MN1 was assembled with MN3 barrel and bolt mechanism and fired satisfactorily.

MN1 was assembled with the MN3 bolt mechanism and MN1 barrel, and functioned satisfactorily.

The barrel recoil travel was varied from 3/8ths to 31/64ths of an inch without affecting the functioning.

A very frequent test is that of firing a Johnson with a 24-inch barrel, then removing it and firing the same gun with a 20-inch barrel. The function is not affected. Thus one rifle can be used as a carbine or as a rifle by employing a spare barrel.

NOTE: All Johnson rifles now built and all those built since the construction of the three proof models, including the proof models themselves, are made according to the complete and proven production drawings, and all parts are interchangeable.

9. Bayonet tests.—It has been stated above that the Johnson Semi-Automatic Rifle can be adapted to carry any regulation bayonet. The rifle functions with a fixed bayonet (U. S. Army pattern, weight 1 lb.). The inevitable conclusion is that the functioning of the rifle is unaffected by the fixing of a bayonet.

Bayonet practice was carried out on dummies, and no damage to the rifle or the action was sustained. Indeed, after conducting penetration tests on pine boards it appeared that the short recoil of the barrel actually tends to increase the penetration of the bayonet.

Attention must be drawn to the fact that the rifle cannot be discharged while making the point. (i.e.: When the barrel is recoiled by the force of the thrust, the bolt is unlocked and the firing pin cannot reach the primer).

The instant that pressure on the bayonet is released, however, the barrel recoil spring returns the barrel to "battery", and the rifle can be discharged. The common and practical expedient for assisting the withdrawal of the bayonet by firing a round is as readily available in the Johnson as in rifles of any other type.

Appendix III

COMMENT

NOTE: Many of the factors bearing upon the problem of developing the most suitable mechanism for a military semi-automatic or light weight machine gun may be found in the article "What Price Automatic", by Melvin M. Johnson, Jr.: "Army Ordnance" September-October 1936 (Part I) November-December 1936 (Part II). The rationale set forth there was followed prior to its composition in developing this rifle.

The Johnson rifle permits instant removal of the barrel and stripping of its parts for care and replacement. It also offers an extremely simple mechanism which can be mastered by the least intelligent, and one which can be manufactured easily in quantity. There are relatively few parts, many of them intentionally conventional to avoid confusion in instruction.

The mechanism for locking and unlocking, for extracting and ejecting, for cocking and reloading is the heart of any self-loading mechanism. The Johnson mechanism is positive, depending on the most fundamental force, that of recoil, for its motive power. The tendency of the Johnson mechanism to provide positive unlocking is obvious. Nothing is more certain than that the barrel will recoil when fired if free to do so. The bolt must, of course, go with it. The automatic unlocking is therefore absolutely reliable. This is an inherently simple means of producing unlocking without complications.

If the Johnson rifle depended upon the exact distance of barrel recoil to insure proper timing as to the exact amount of residual pressure, the retraction of the bolt would be uncertain and unreliable. This mechanism, however, regulates its unlocking time directly in proportion to the resistance of the bolt to unlocking under pressure. The movement of the barrel is incidental.

This phenomenon can be explained more technically, but it is that the desired result has been achieved rather than an ex post facto mathematical calculation which is important.

In a word, the bolt regulates its own unlocking time with each round (in turn relatively regulated by the amount of its rotation) by the variable pressures which it experiences, and by the angle of the camming surfaces against which, during recoil, it rotates.

In proof, the barrel movement can be increased 1/32 of an inch, or weights added to the barrel to increase its inertia, and ejection is obtained, notwithstanding. Such variations, of course, cannot be made to an unlimited extent without encountering a noticeable alteration in the action. There are, however, wide margins within which reliable actuation is obtainable.

If the pressures were too great, the retracting power could be reduced by:

(1) increasing the amount of locking.
(2) increasing the angle of the camming surfaces.
(3) using a stronger barrel recoil spring.
(4) putting a friction band on the barrel locking bushing or barrel guide collar.
(5) using a heavier barrel.
(6) a combination of any of the above changes.

Retracting power could be increased by:

(1) decreasing locking.
(2) decreasing angle of cams, etc.

In view of the above, it is not necessary to manufacture the actuating parts with extreme nicety. No dimension of any part need be closer than several thousandths of an inch. In consequence, the parts can also be subjected to excessive wear without rendering the weapon unserviceable or unsafe.

The Johnson mechanism employs a modified rotary bolt, a locking system which is simple, time-tried, and completely reliable. The Johnson bolt, however, will withstand pressures far in excess of those normally used in modern military weapons. It will be especially adaptable to any ultra-high-speed armour-piercing rifle ammunition of the near future. The actuation is basically dependent upon the bolt, which, due entirely to the design of the lugs, can be unlocked quickly from a fully-locked position.

Due to the construction of the firing pin, the rifle can never be discharged unless the bolt is locked. The position of the operating handle indicates whether or not the bolt is locked.

If the eight locking lugs should give way, the bolt stop and bolt stop plate effectively protect the operator from a blow back. The operating handle would serve as a safety lug in the event of the bolt blowing back and breaking the bolt stop.

The rifle can be fired by manual operation if desired. To do this, insert a ⅜ths inch thick washer or "block" behind the barrel to hold it in its forward position. Unless the barrel can recoil, the bolt cannot unlock automatically.

A number of parts can be removed without rendering the rifle incapable of firing and ejecting the cartridges.

It is believed that the Johnson mechanism is unique, in that it is the first high-powered rifle to utilize any residual pressure for extraction WITHOUT necessitating LUBRICATED CARTRIDGE CASES. To stress the fewness of parts in any mechanism is misleading. It is the simplicity of parts, rather than a reduction in their number, which has been accomplished in this weapon. Yet the Johnson Semi-Automatic Rifle has no more parts than a corresponding military repeating, bolt-action rifle.

Appendix IV

GENERAL SIMILARITY TO U.S. RIFLE, CAL. .30, M1903

Inasmuch as the M1903 Springfield served, in part, as an inspiration for the Johnson Semi-Automatic Rifle, certain comparisons can be made.

1. Barrel and front sight; same on both rifles; Johnson barrel slideable 3/8ths of an inch to permit automatic unlocking.

2. Locking system: Johnson rifle modified by using eight lugs in order to achieve a rotary bolt capable of unlocking more rapidly, yet having even greater locking strength than the M1903 Springfield.

3. Extractor: generally similar, but Johnson claw shorter so as to avoid strain; no rotating collar; easier to dismount.

4. Ejector: same type; Johnson larger, stronger; dismountable from outside.

5. Camming arm: Johnson camming arm similar in location to M1903 rifle; on Johnson rifle it causes automatic unlocking.

6. Receiver "bridge": general contour same on Johnson; camming arm guided through extended channel.

7. Cocking cam: note that the same general type of cam used to cock the M1903 on the opening stroke is followed in the locking cam of the Johnson.

8. Stock: the Johnson has followed generally the conventional types of stocks.

9. Trigger and trigger guard are similar to the 1903 Springfield.

10. Trigger pull: although using a "semi-automatic" sear, the Johnson is smoother and lighter than the Springfield.

11. Other parts, such as the firing pin, the hammer mechanism, and the closed receiver are different for obvious reasons. The receiver permits the proper attachment of a telescope, top or side mounting, as desired.

12. Assuming the Springfield contains only "conventional" parts, that is, parts which must be found on any hand-operated rifle, it will be noted that the only "extra" parts found on the Johnson are the mainspring, the link and the cams. All automatics must have a mainspring and a link or "strut". All of the other parts are essentially "conventional".

13. Accuracy: The automatic action of the Johnson rifle in no way affects its accuracy. The accuracy of the Johnson Semi-Automatic Rifle, as in any other, depends upon the quality of the barrel with which it is equipped. Using a Springfield, Enfield, or Mauser barrel, it is fully as accurate as the condition of the barrel permits, and, due to the reduced kick, far less fatiguing to shoot.

JOHNSON LIGHT MACHINE GUN

(See also Catalog of Johnson Light Machine Gun)

Brief description.—The Johnson Light Machine Gun is operated on exactly the same principle and has the same basic action as the Johnson Semi-Automatic Rifle. The only essential differences are that the machine gun is cocked with the bolt open, the hammer being automatically released when the bolt has locked; and that it fires automatically rather than semi-automatically.

Caliber: .30 M1, and other military calibers.

Weight without mounts: 12 pounds.

Barrel: any standard rifle barrel or in certain types, M-G. barrel. Lengths 20 to 26 inches. (Barrel may be removed and replaced in six seconds.)

Cooling: air.

Feed: three types: box magazine; charger-loaded 20, 30, or 40-round rotary feed magazine; belt feed of any belt capacity specified.

Sights: mounted on side.

Cyclic rate of fire: 300-1000 rounds per minute.

Mounts: bipod or tripod.

Number of parts: 86.

Time required for full field stripping: 12 seconds.

Overall length: 42 inches with butt stock and 24-inch barrel. With carbine 20-inch barrel, 38 inches.

Comment.—The Johnson Light Machine Gun can be, and usually has been, fired full-automatically from the offhand position, without any supports, without climbing or undue dispersion.

Parts interchangeable with Johnson Semi-Automatic Rifles: barrel assemblies, extractors, ejectors, operating handles, barrel recoil spring and latch assemblies, hammer struts, hammer pins, hammer springs, and a number of miscellaneous pins in the various part groups.

Individuals familiar with the Johnson Semi-Automatic Rifle require practically no instruction on the Johnson Light Machine Gun. This greatly simplifies the training program. It is believed that no such combination of infantry weapons has ever before been made available. (See catalog of the Johnson Light Machine Gun.)

SPECIFICATIONS OF THE JOHNSON SEMI-AUTOMATIC CUSTOM-BUILT SPORTING RIFLE

Calibers: .30-'06, .270, .35 Whelan and other high powered calibers.

Weight: Approximately 8¾ pounds. Weight varies according to barrel length, style of stock, etc.

Magazines: Detachable box, vertical feed type. 3 shot and 5 shot capacity. Two of each included as standard equipment.

Sights: Johnson all-purpose protected post front sight. Johnson standard receiver peep sight with elevation to 1000 yards and windage screw in minutes of angle scale with clicks.

Stock: Fine American walnut. Full or semi-pistol grip. If specified, stock will be furnished inletted but unfinished so that the buyer may incorporate the dimensions he desires.

Action: Johnson patented short-recoil type with 8 lug rotary bolt. Main action spring in stock.

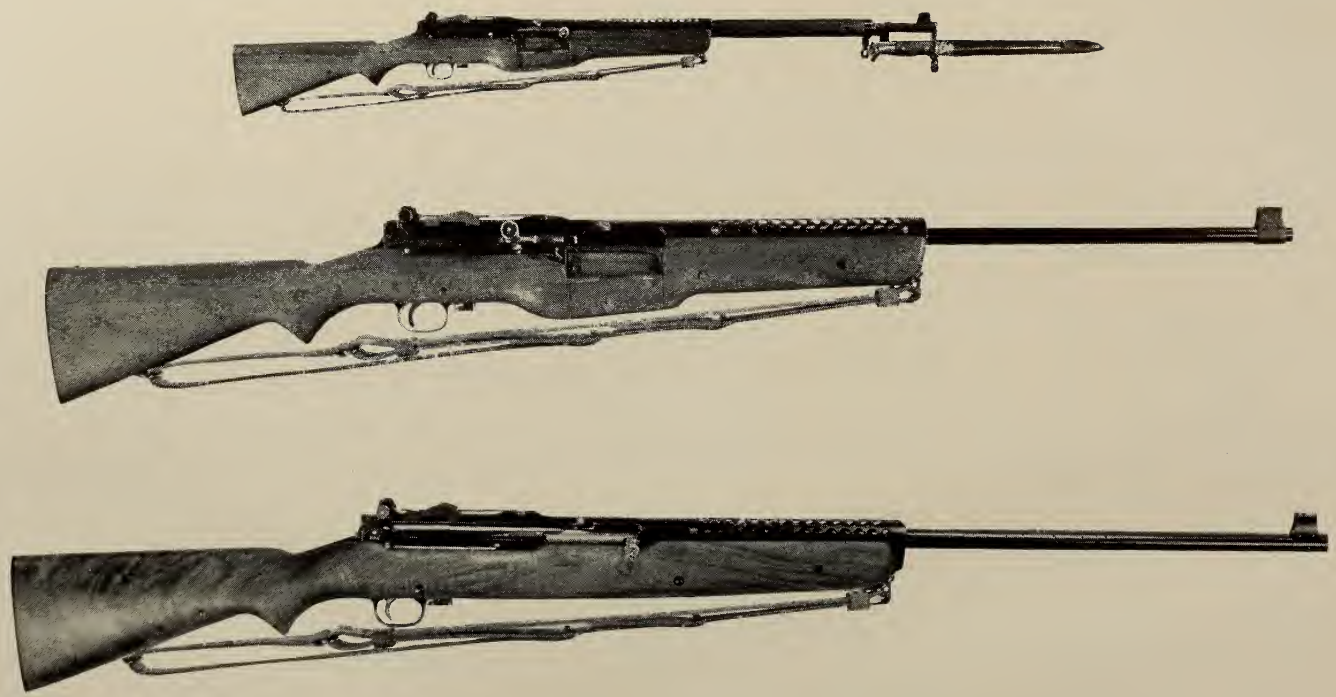
Finish: Dull black or standard blue.

Trigger Pull: Variable—2 to 5 pounds, as desired.

Barrels: Johnson barrels, 20, 22, 24 inch. Any adaptable barrel furnished us by the buyer will be refinished and fitted to his Johnson rifle without extra charge.

Spare Parts: We can give prompt service in the event of the loss or damaging of any parts. Barrels should be replaced after 10,000 rounds.

Extra barrels: Obtainable on special order, including Johnson front sight, barrel locking bushing, and barrel guide collar, finished to match rifle, fitted and sighted in.



Top—Johnson Semi-Automatic Rifle, Type R, with 10-shot rotary feed magazine, bayonet and handguards attached. *Center*—Johnson Semi-Automatic Rifle, Type R, with 10 shot rotary feed magazine. Bolt is shown open, as it remains after the last shot is fired. *Bottom*—Johnson Semi-Automatic Rifle, Type V, with detachable box vertical feed magazine.

Fig. 1—Charging the 10-shot rotary magazine from a Springfield clip—bolt closed.

Fig. 2—Charging the 10-shot rotary magazine from a Springfield clip—bolt open.

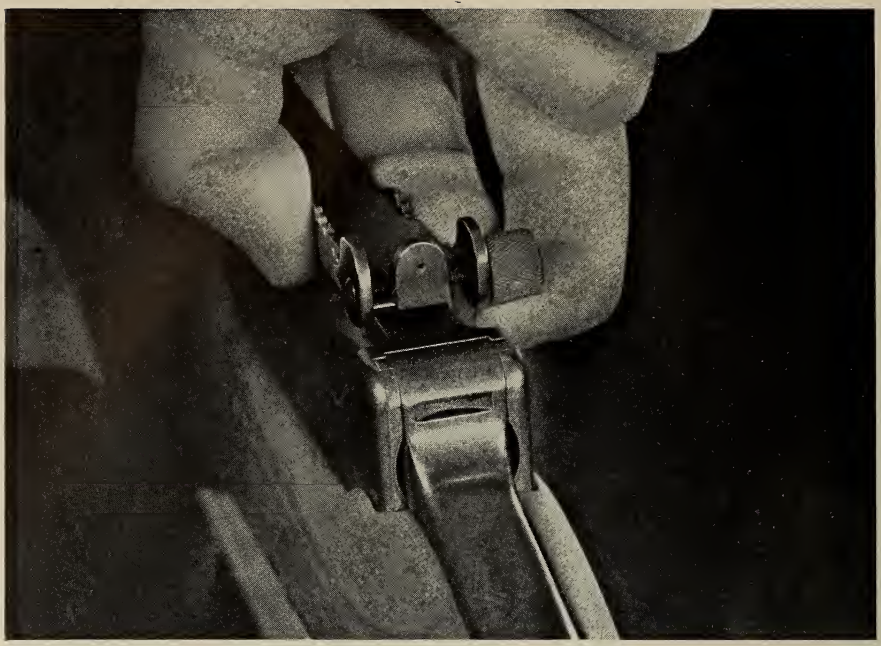


Fig. 3—Elevating the rear sight by sliding the rear sight elevator to the rear with the thumb and forefinger while lifting up on the windage knob to raise the rear sight leaf.

Fig. 4—Dismounting the barrel. The barrel latch plunger has just been disengaged by the point of a cartridge and the barrel recoil spring and latch assembly has been swung out of its locked position by recoiling the barrel manually with the left hand.

Fig. 5—Withdrawing the barrel from the receiver after releasing the barrel latch assembly. Operating handle is raised by the right forefinger to unlock the bolt from the barrel.

Fig. 6—Removing the bolt stop plate after having disengaged the bolt stop plate plunger by depressing it with the point of a cartridge.

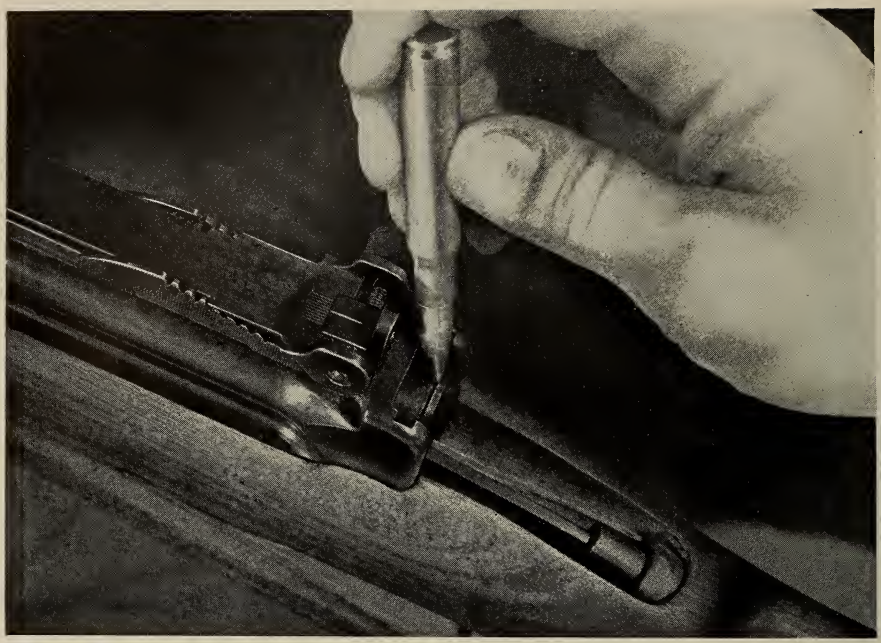


Fig. 7—Removing the bolt stop with the point of a cartridge.

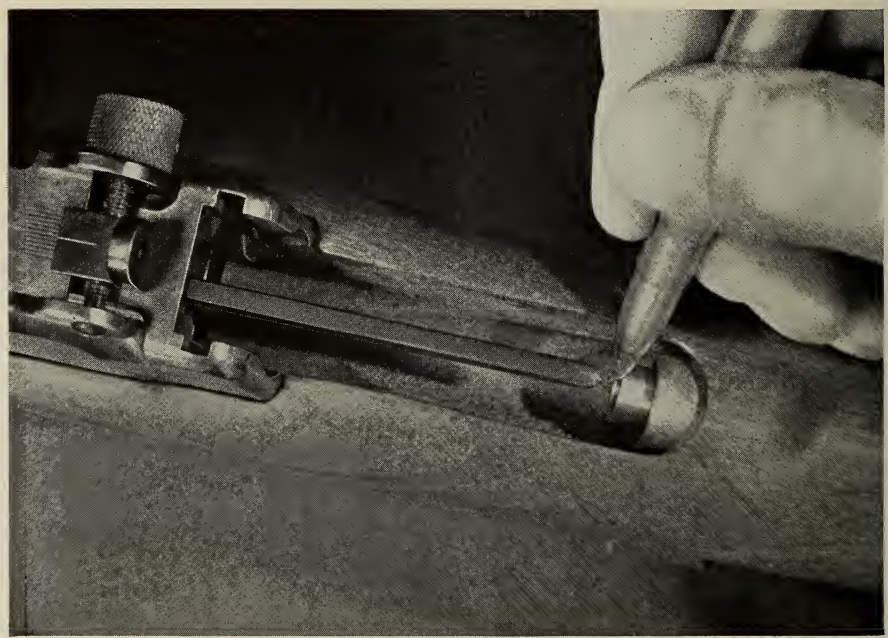


Fig. 8—Disengaging the link from the mainspring plunger by compressing the plunger with the point of a cartridge.

Fig. 9—Withdrawing the bolt group from the receiver after having removed the operating handle.

Fig. 10—Disengaging the hammer block pin with the point of a cartridge. The hammer block pin is then withdrawn.

Fig. 11—Pulling the butt stock from the receiver after removing the bolt stop plate and hammer block pin.

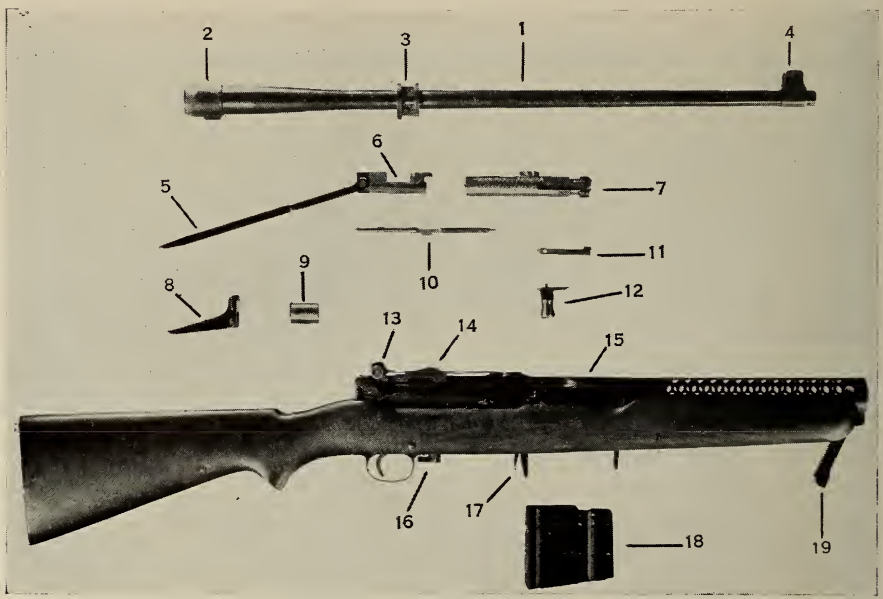


Fig. 12—Field stripping of a Johnson Semi-Automatic Rifle, Type V (vertical feed magazine). Operation is similar on Type R (rotary feed magazine) rifle.

1. Barrel
2. Barrel locking bushing
3. Barrel guide collar
4. Front sight
5. Link
6. Locking cam
7. Bolt
8. Bolt stop plate
9. Bolt stop
10. Firing pin
11. Extractor
12. Operating handle
13. Windage knob
14. Rear sight elevator
15. Receiver
16. Safety lock lever
17. Magazine catch
18. 5 shot detachable box magazine
19. Barrel recoil spring and latch assembly

1. Barrel
2. Barrel locking bushing
3. Barrel guide collar
4. Front sight
5. Bolt stop plate
6. Bolt stop
7. Windage knob
8. Rear sight elevator
9. Ejector
10. Ejector pin
11. Receiver
12. Link
13. Bolt catch
14. Link pin
15. Locking cam
16. Firing pin
17. Hammer pin
18. Extractor
19. Bolt
20. Barrel recoil spring and latch assembly
21. Operating handle
22. Hammer assembly
23. Hammer block
24. Hammer block pin
25. Forestock screws
26. Forestock
27. Butt stock
28. Rear trigger guard (wood)screw
29. Trigger guard
30. Front trigger guard screw
31. Safety lock lever
32. Hammer block screw
33. Transverse magazine pin
34. Longitudinal magazine pin
35. Rotary magazine assembly

Fig. 13—Johnson Semi-Automatic Rifle, Type R, completely stripped.

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